Health Services
LOS ANGELES COUNTY

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To improve health through leadership, service and education.

July 3, 2008

TO: Each Supervisor

FROM: John F. Schunhoff, Ph.D.
Interim Director

SUBJECT: **FACILITIES DEVELOPMENT, INC. (FDI) ANALYSIS ON LAC+USC EMERGENCY DEPARTMENT BOARDING TIME AND SURGE CAPACITY**

On April, 22, 2008, your Board instructed the Department to work with the Chief Executive Office and FDI to conduct a study and present findings on how a patient surge of 5 percent, 10 percent, 15 percent, and 20 percent could affect the Emergency Department Boarding Time of the LAC+USC Replacement Facility when the hospital operates at 80 percent, 85 percent, 90 percent and 95 percent occupancy, and provide an assessment on the regional impact of such surge. As noted in the memorandum to your Board from the Chief Executive Office dated June 23, 2008, this report will be presented at the July 8, 2008 Board meeting.

This is to provide your Board with the attached simulation analysis prepared by FDI on the LAC+USC Emergency Department Boarding Time and Surge Capacity at the Replacement Facility.

Additionally, FDI has begun a similar regional analysis which will evaluate Olive View-UCLA and Harbor-UCLA Medical Centers, and the regional impact report of all three County hospitals and their Emergency Departments will be presented to your Board in October.

Also attached for your review, is a current draft of the contingency plan, which was developed in the event that additional inpatient beds are required for LAC+USC Medical Center, because of the predicted surge. The contingency plan provides for additional inpatient capacity at Rancho Los Amigos National Rehabilitation Center.

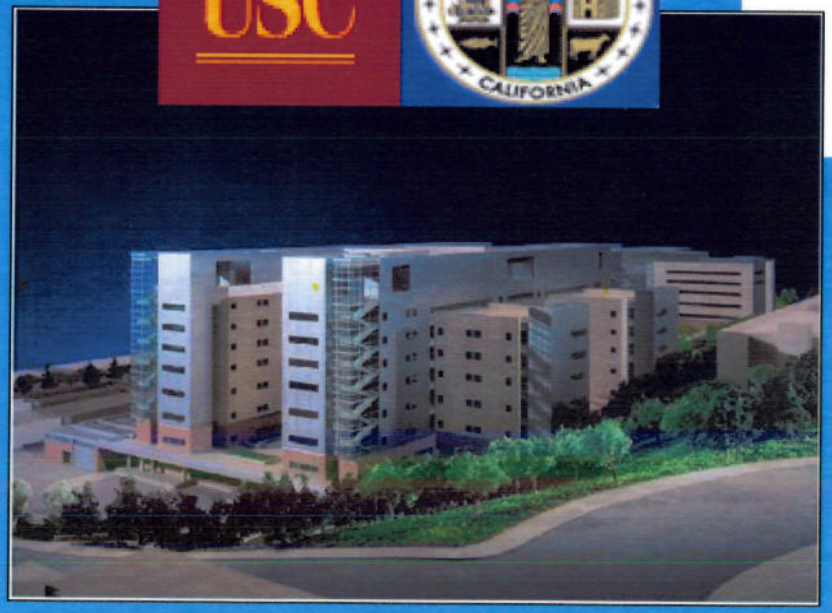
If you have any questions, please let me know.

JFS:rs

Attachments

c: Chief Executive Officer
County Counsel
Executive Officer, Board of Supervisors

LAC+USC
Emergency Department Simulation
ED Boarding Time and Surge Capacity Analysis

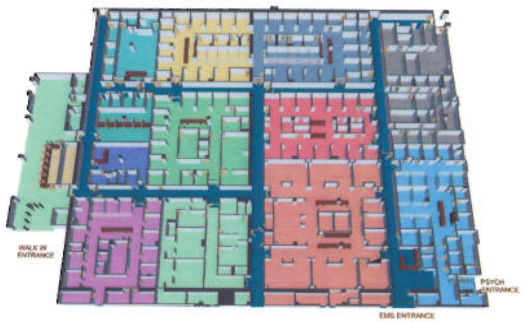


fDI

July 8, 2008

Summary Report

Summary



- Expect 5% increase in patient arrivals, but 10-15% also possible
- Hospital opens at the tipping point
- Should staff 100% of all possible inpatient beds and run very efficiently to maintain 95% utilization
  - Inpatient bed utilization below 95% will cause overcrowding in the ED
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Why Simulation?

Simulation Models need many inputs to accurately model a facility…

How many beds?

How many patients?

What activities occur for each patient?

Who does each activity?

How long does it take?

The simulation answers difficult questions about how the facility will operate…

How long will patients wait?

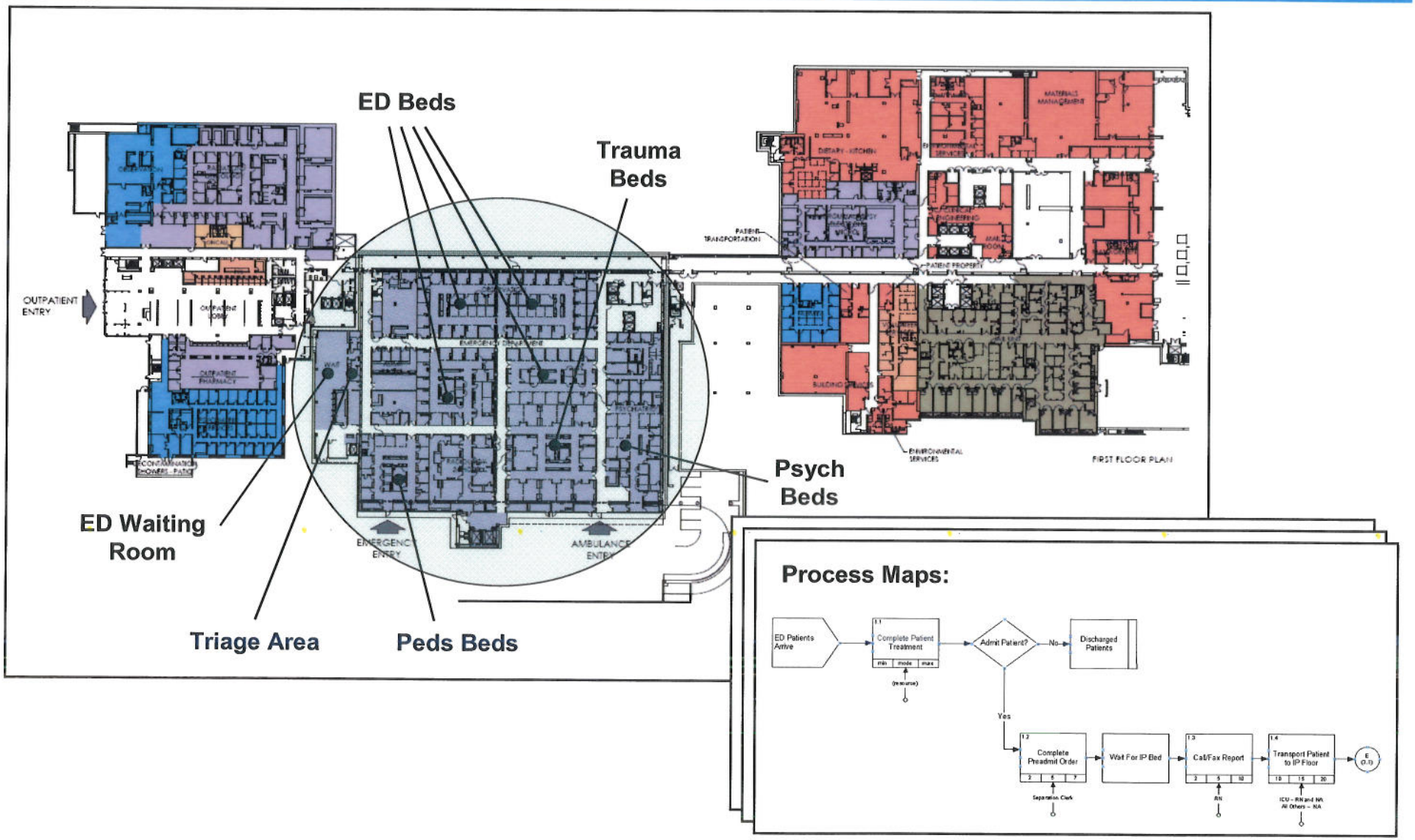
When does it get full?

How many more beds do we need?

Can we handle more patients?

Does that improvement save time?

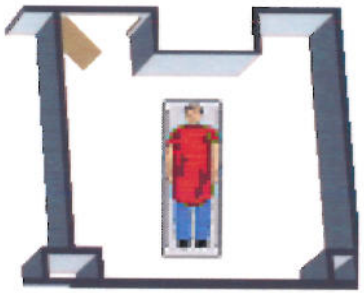
New Facility ED Design



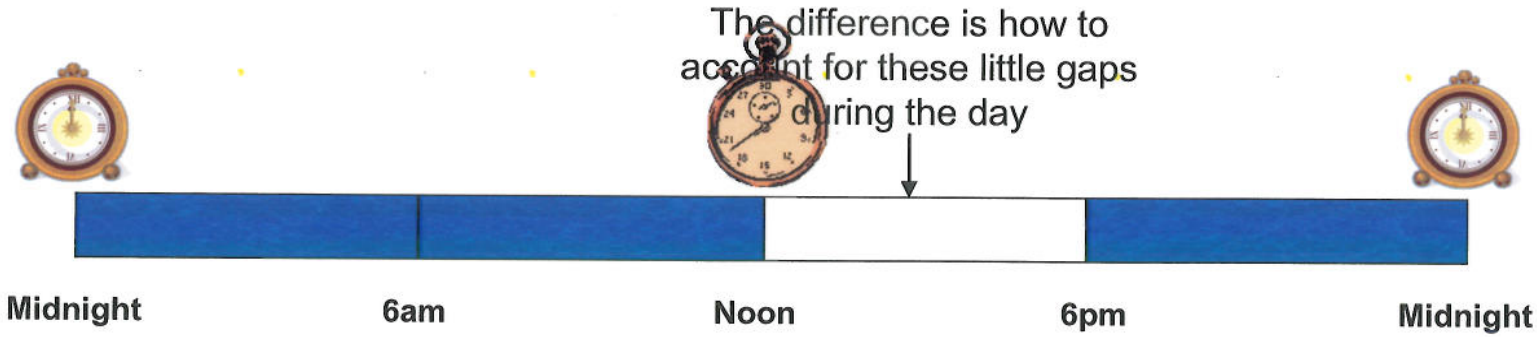
Glossary

Boarding Time	The time from when the physician writes the order to admit until the patient is placed in an Inpatient bed.
LWBS	Leave Without Being Seen; patients who leave before placement in an ED bed, usually due to long wait times
Arrivals	Patients that present to the ED and are placed in an ED bed. LWBS or routed to appropriate area; ED arrivals may not be exactly the same as ambulatory visits
Patient Surge	Increase in patient arrivals to the ED
IP Bed Occupancy	Standard used for hospital reporting; Occupancy is calculated as the number of patients in beds at midnight divided by the number of staffed beds available.
IP Bed Utilization	Used primarily in simulation modeling; Utilization is calculated as the total hours that a bed is used in a day divided by 24 hours. Utilization is generally a lower number than Occupancy, but more accurate. 95% utilization will approximately equal 98% occupancy
Other IP Admits	Inpatient admits which come from other sources besides the ED, such as Transfers, Direct Admits, etc.
UADC	Urgent Access & Diagnostic Center; a unit designed to provide urgent, scheduled access for low-acuity patients who present to the ED, thereby decreasing wait times for all ED patients

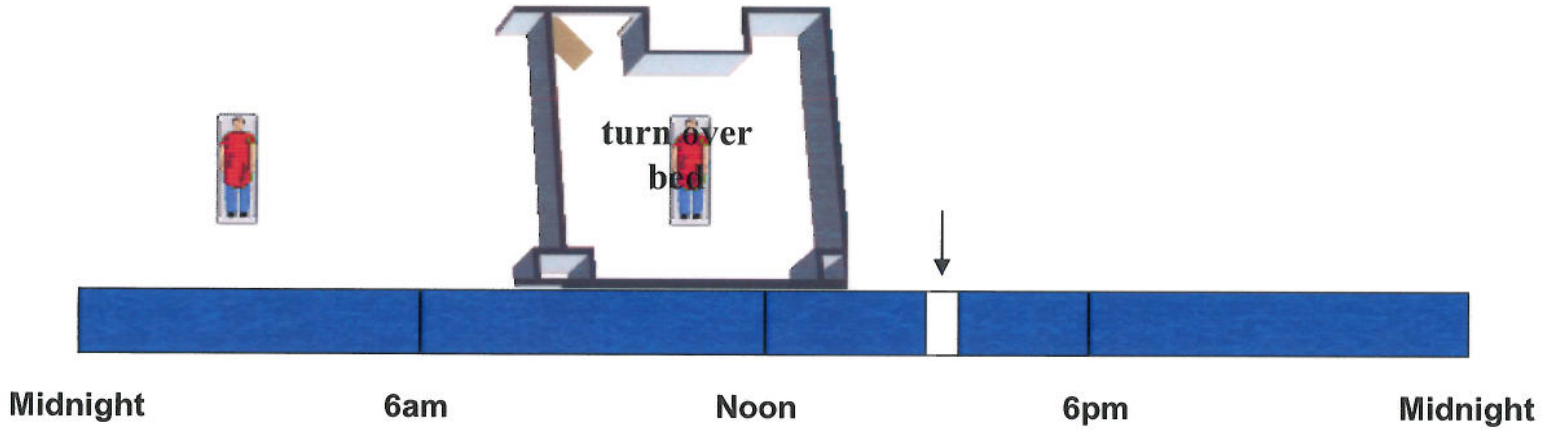
Occupancy vs. Utilization



- What is difference between ADC and Utilization?
- Consider this example:
    1. Sample taken at midnight (1 patient)
    2. Patient discharged at noon
    3. New patient admitted at 6pm
    4. Sample taken at midnight (1 patient)
- Avg. Daily Census = 1 (100% full)
- However, Utilization = 18/24 hrs = 75%



Occupancy vs. Utilization



- How long is this time gap for 95% utilization?
- 95% of 24 hours is 22.8 hours
- This leaves, on average, 1.2 hours per day for an empty bed
- Average LOS in each unit is 3.5 days[1]
- 3.5 * 1.2 = 4.2 hours, which is the allowed time to turn over a bed
- LAC+USC currently takes about 2 hours to turn over a bed[2]

[1] Source: FDI__LACUSC Inpatient Volumes and Routing - All Inpatients Discharged in CY 2006
[2] Extrapolated from 98% occupancy of "staffed" beds; LAC+USC will soon implement a system to better collect this type of data

Modeling Assumptions

- Actual Arrival Data
- Patients placed according to priority
- Activity durations based on historical data and/or Functional Expert estimates
- Simulation analysis focused on Main ED; Some patients were routed directly to areas such as Burn, Jail, NICU and UADC.
  - UADC patients arrive, triage, then route to UADC
  - UADC is important because of its ability to handle low acuity volume from the ED
  - If UADC volume is kept in the ED, the ED would be overwhelmed
- 95% Inpatient utilization is attainable, but difficult
- 95% Inpatient bed utilization is calculated without Burn, Jail and NICU beds; utilization drops to 90% when including with these dedicated units.
- Patients LWBS if not placed in an ED bed within 24 hours of arrival; this was a sufficiently conservative estimate; recent studies show most patients LWBS within 18 hours of arrival.

Model Updates

- The scope of this effort is to update the 2006 LAC+USC Emergency Department Simulation Model with key 2007 input data
- This does not include repopulating the complete 2007 data set or re-baselining the model

Key Summary Data	Original Data	New Data
Annual ED Arrivals (1050, 1060, 1350, W&C, Psych, Jail, UADC)	169K	167K
IP Admits from ED	25K	25K
IP Admits from Other	5,400	6,200
IP LOS	6.2 days	5.5 days
Avg. IP Discharge Time Of Day (DTOD)	4:30 pm	2:00 pm

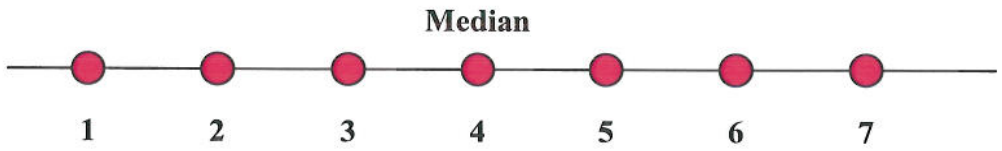
Model Updates

FDI ED ARRIVAL VOLUME CY 2007 ACTUAL	
Unit	Arrival Volume FDI Simulation
1050	36771
1060	38275
1350	23781
Jail	8743
PEDS	22092
Subtotal	129662
UADC	27500
Psych	9465
OB	606
Subtotal	37571
Simulation Total	167233
Assumptions	
- UADC and OB Volumes are the same as 2006	
- Inpatient admit rate is the same as 2006	

Basic Definition and Significance

- Mean (Average) – the sum of all observations divided by the number of observations
  - Each observation affects the value of the mean
  - Outliers, extremely high or low values, can skew the value of the mean

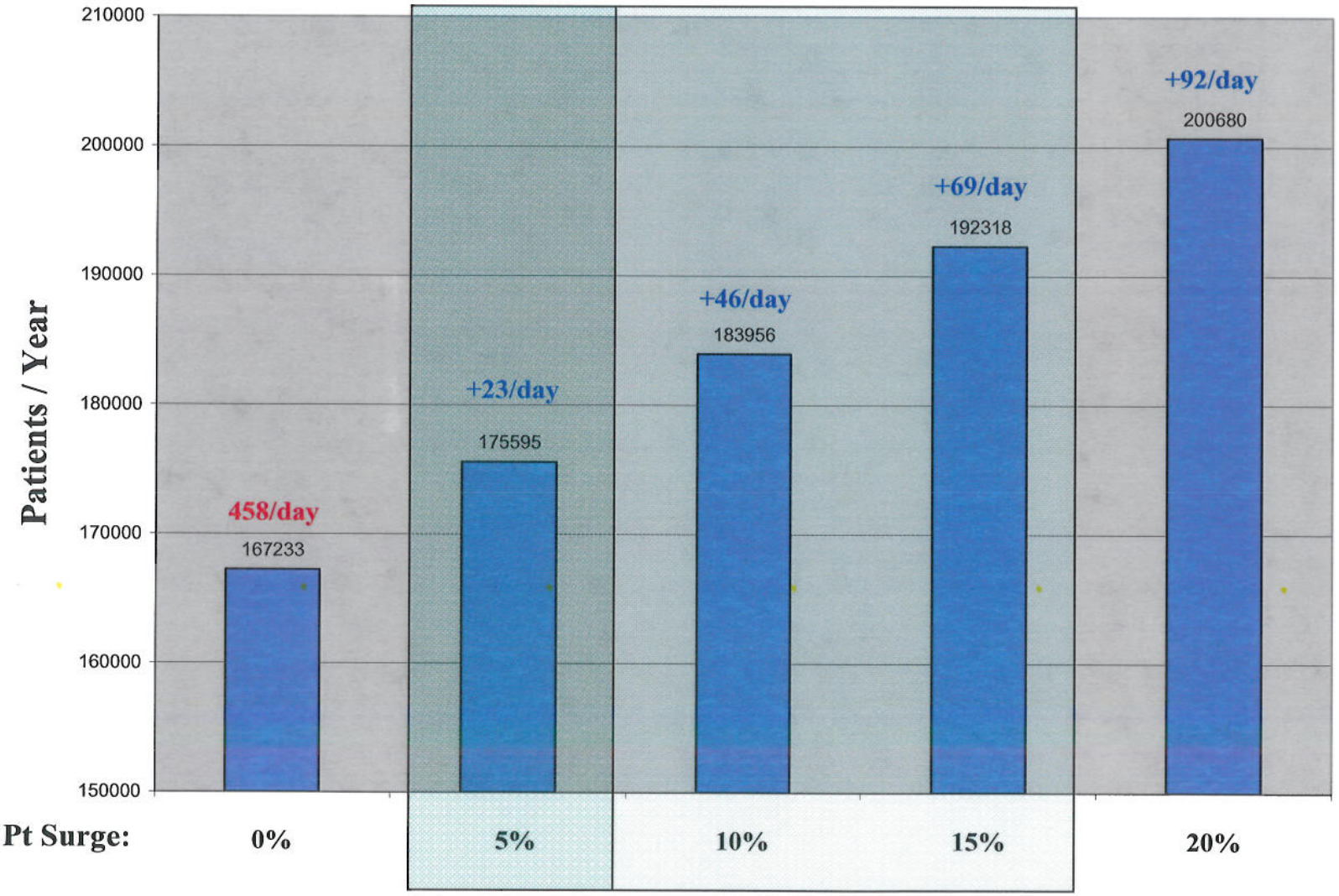
- Median – the middle number within a set of numbers
  - Often referred to as the "most likely" value
  - Not affected by outliers
  - Is not affected by every value, the only number that matters is the center number
  - CAN BE MUCH GREATER OR LESS THAN MEAN



Every 5% surge in patients equals about 8,500 more patients per year or about 23 more patients per day.

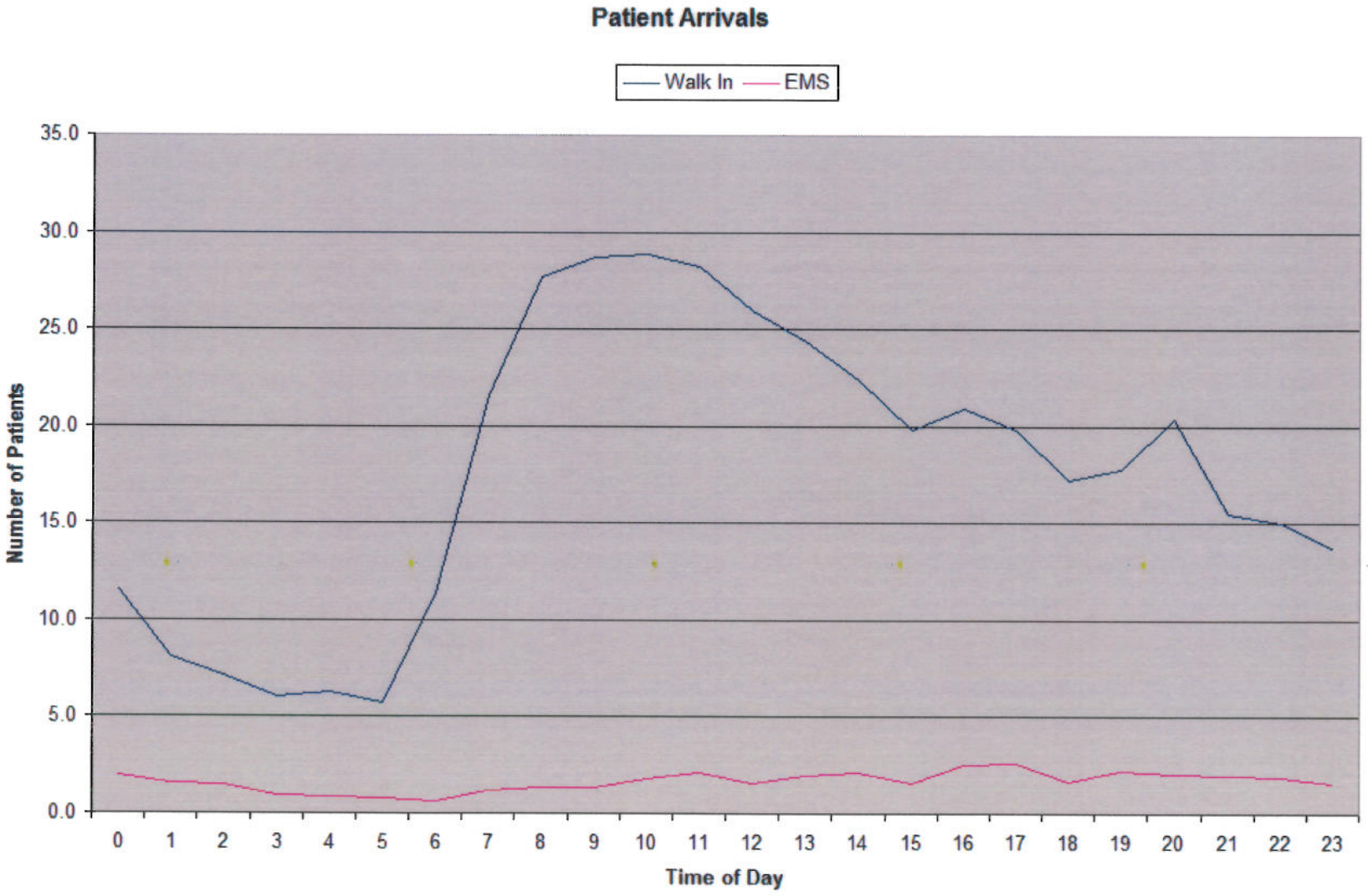
ED Patient Arrivals

(1050, 1060, 1350, W&C, Psych, Jail, UADC)



Our model uses the 2006 ED patient arrival pattern, which shows highest volumes in the late morning

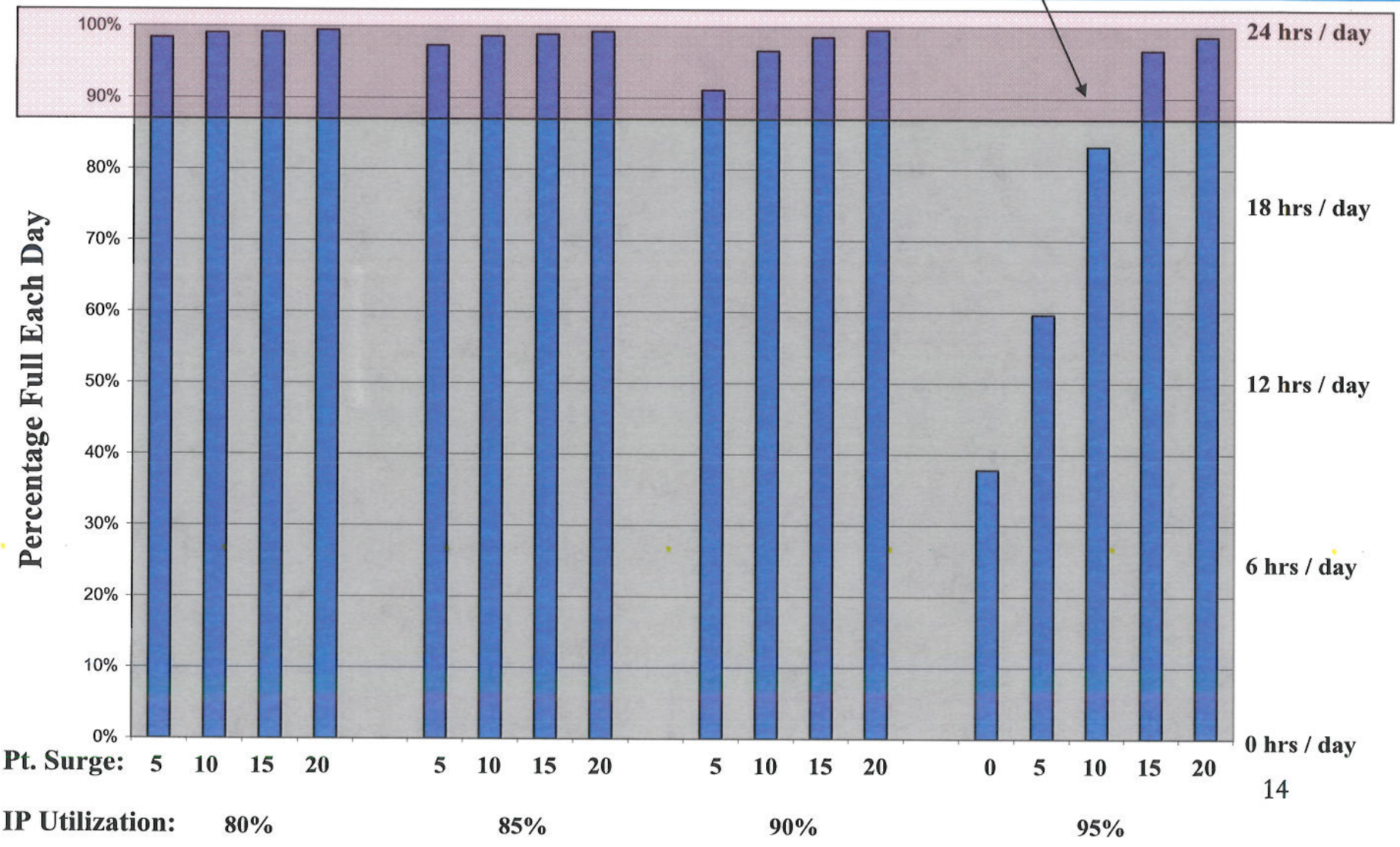
ED Patient Arrivals by Hour
(LAC+USC 2006 actual)



The simulation shows the ED will stay full almost all the time until IP utilization reaches at least 95%

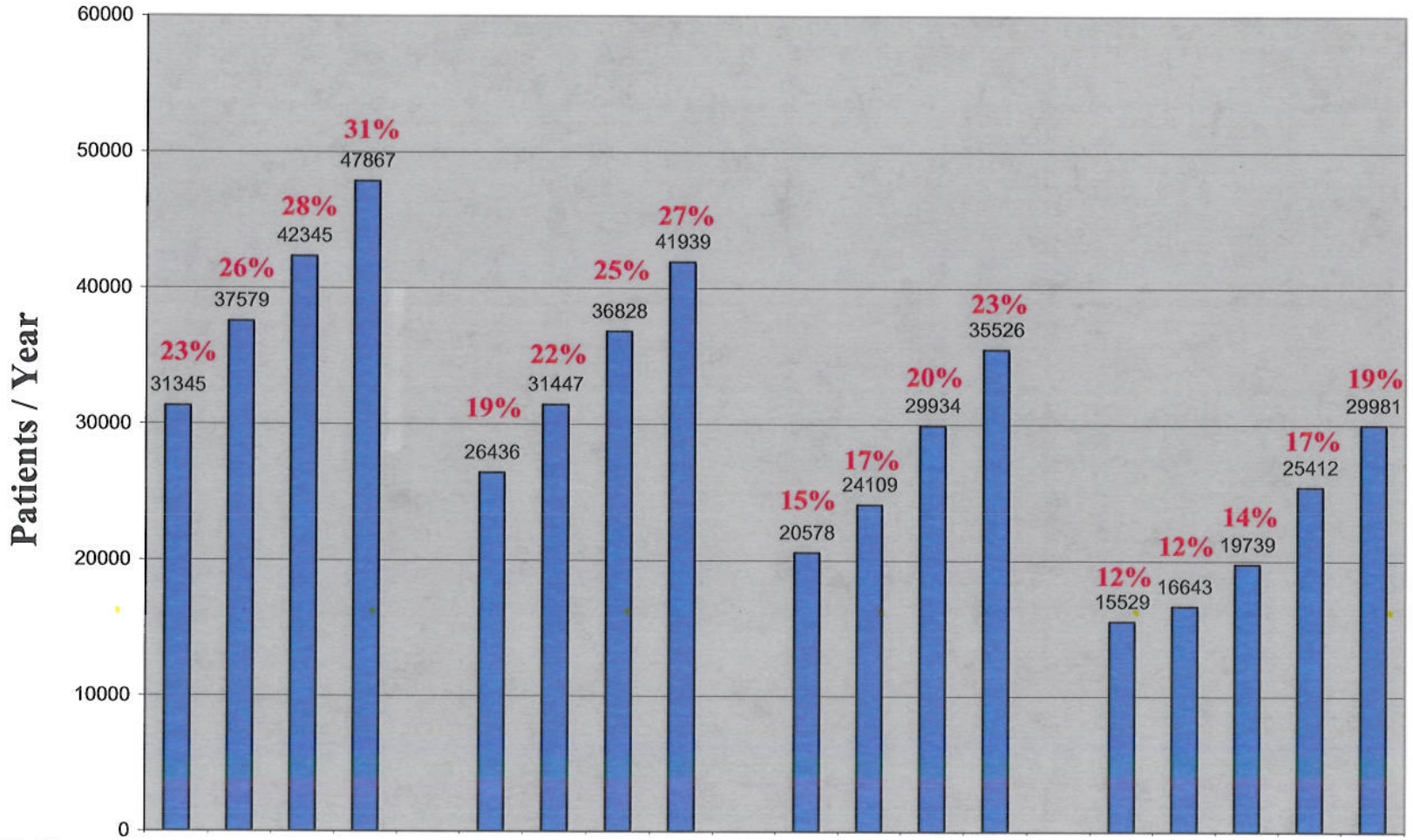
Percent of Day That ED is Full

This is the breaking point



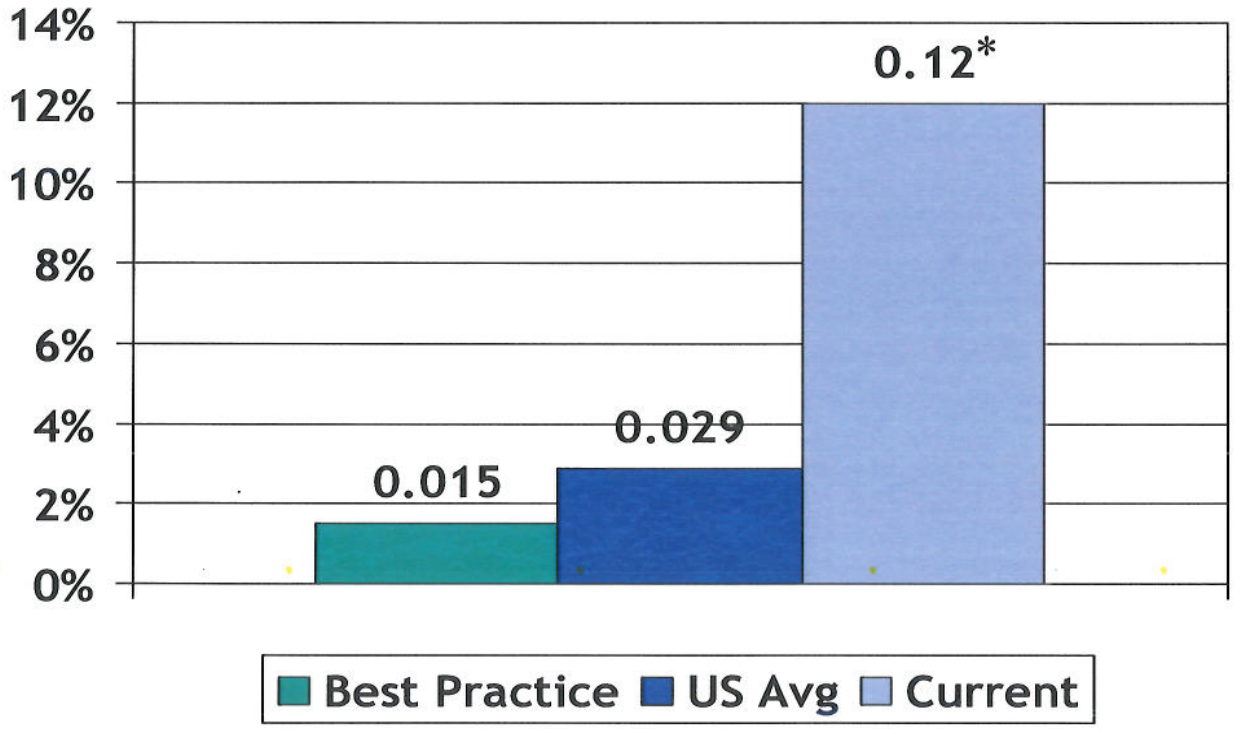
Most of the patients that leave without being seen do so because the ED is full and they would wait over 24 hours for an ED bed.

ED Patients LWBS



ED Patients LWBS

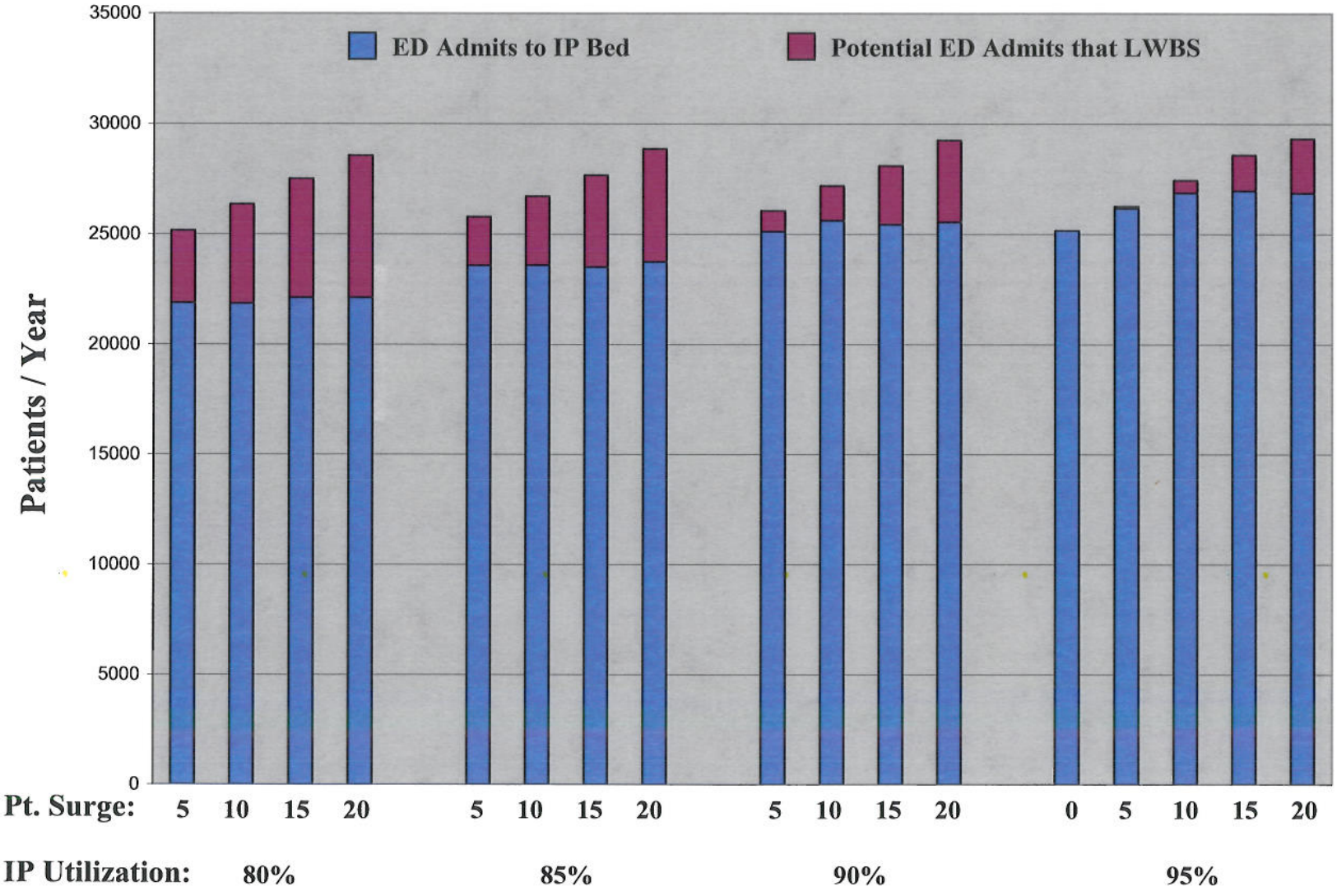
* From 2006 Data



Reference Source : CDC National Hospital Ambulatory Medical Care Survey: 2002 Emergency Department Summary. No.340 March 18, 2004

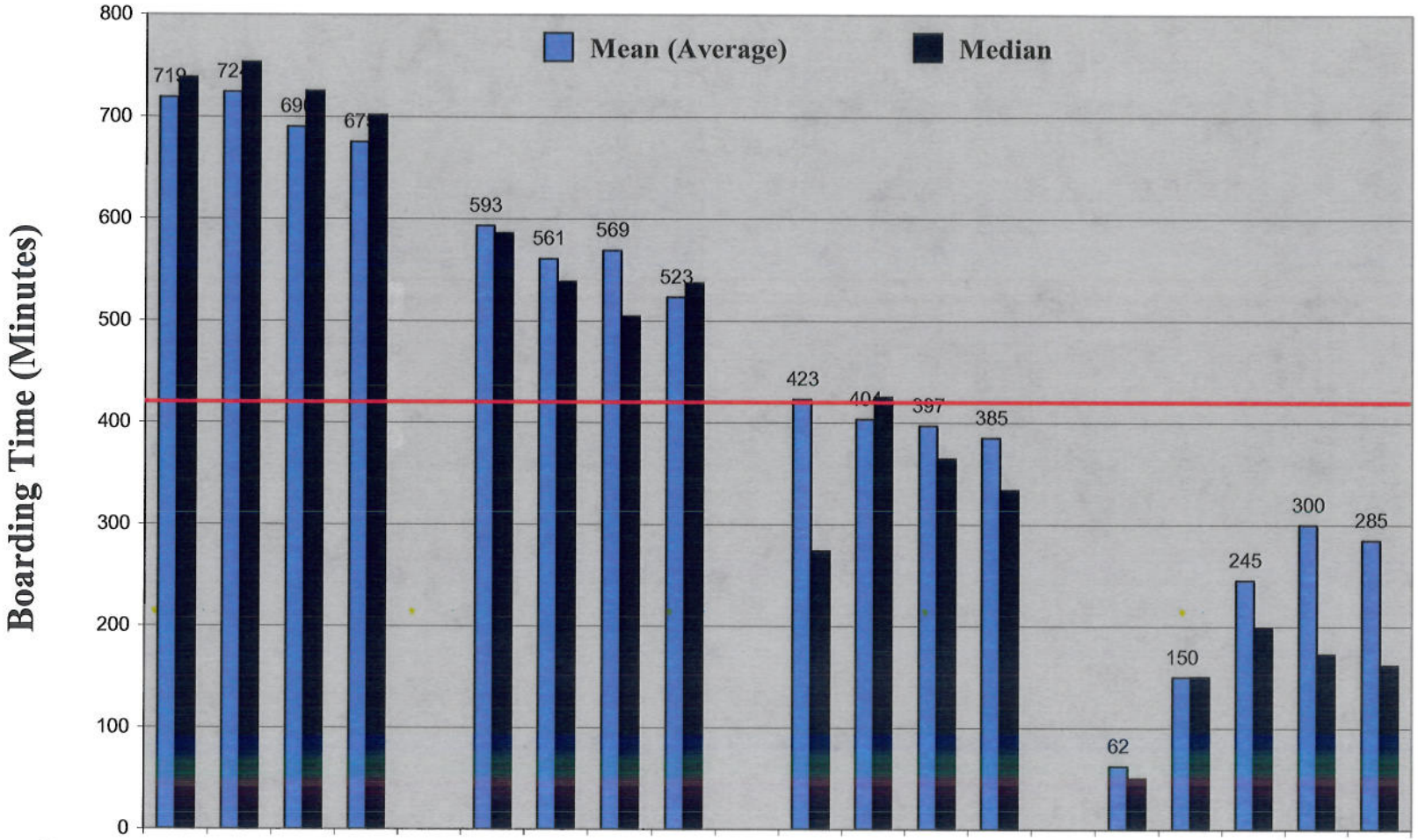
The Inpatient Units are full and cannot handle more patients, so potential admits from the ED will LWBS

Inpatient Admits from ED



Inpatient utilization must be at least 90% to meet the 7 hour Harris-Rodde requirement

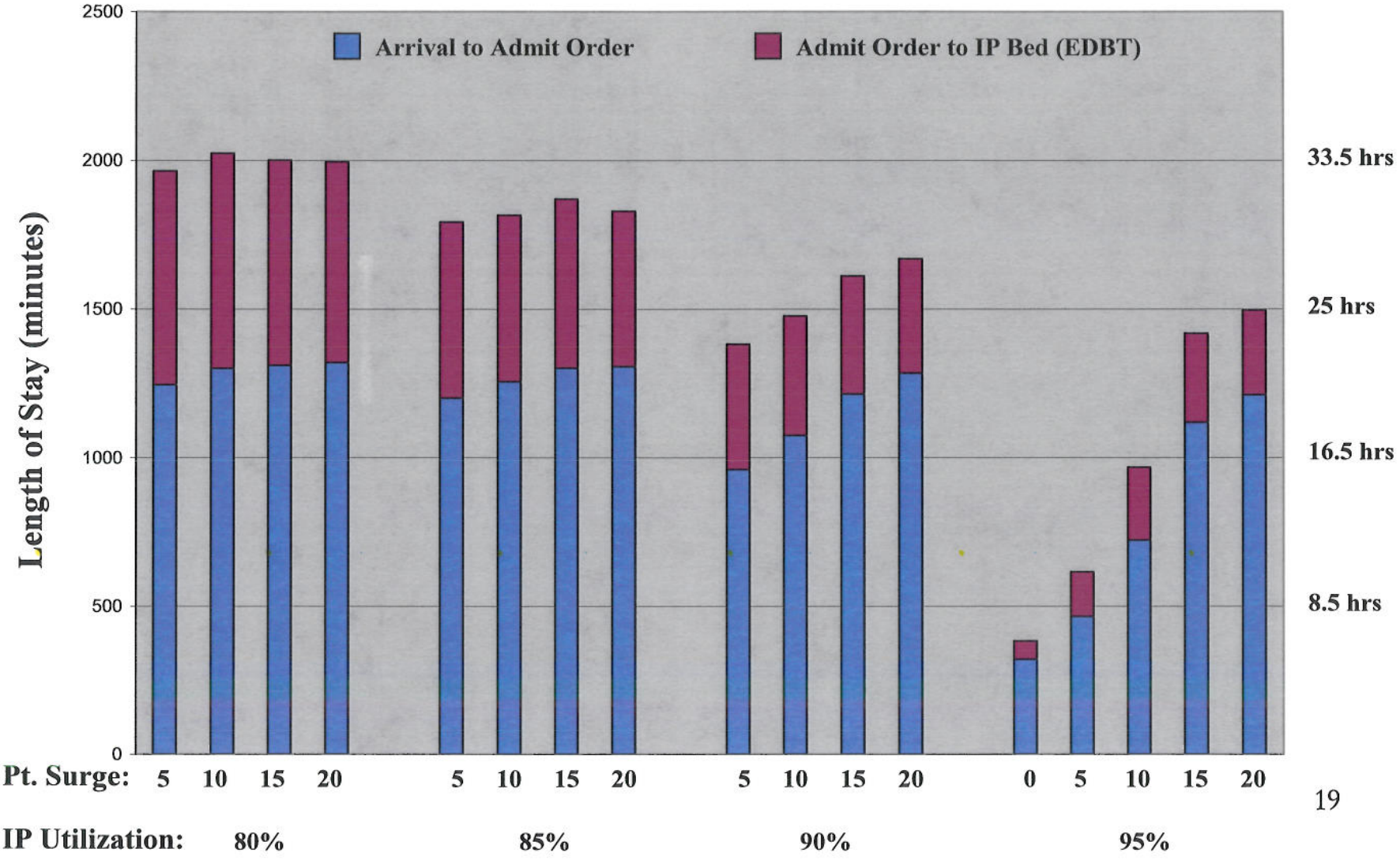
Emergency Department Boarding Time



Recommend taking IP utilization to 95% to prevent patients from spending at least a day in the ED before they are admitted to an inpatient unit.

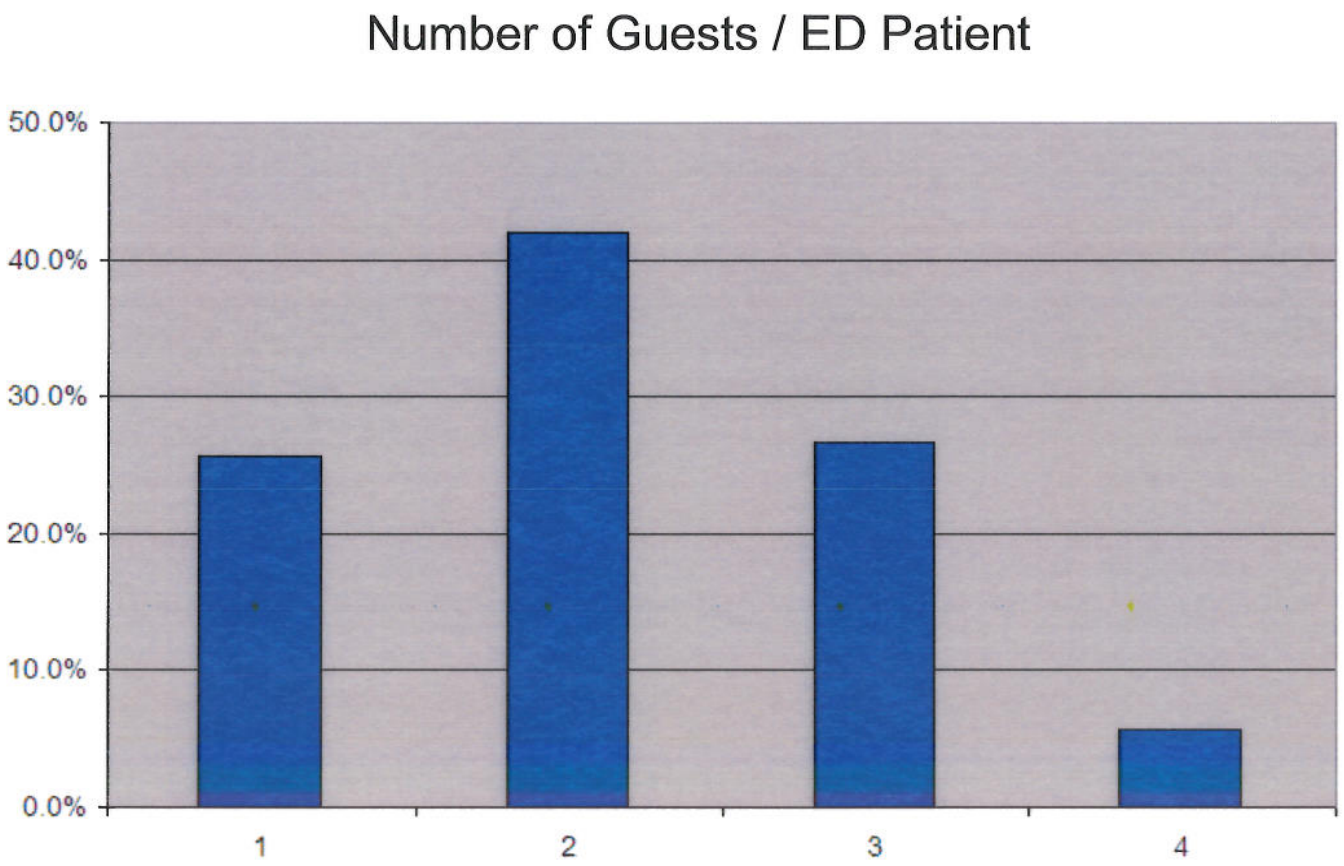
Average ED Length of Stay

ED patients admitted to IP Bed



The team observed hundreds of patients and recorded the number of guests that accompanied them.

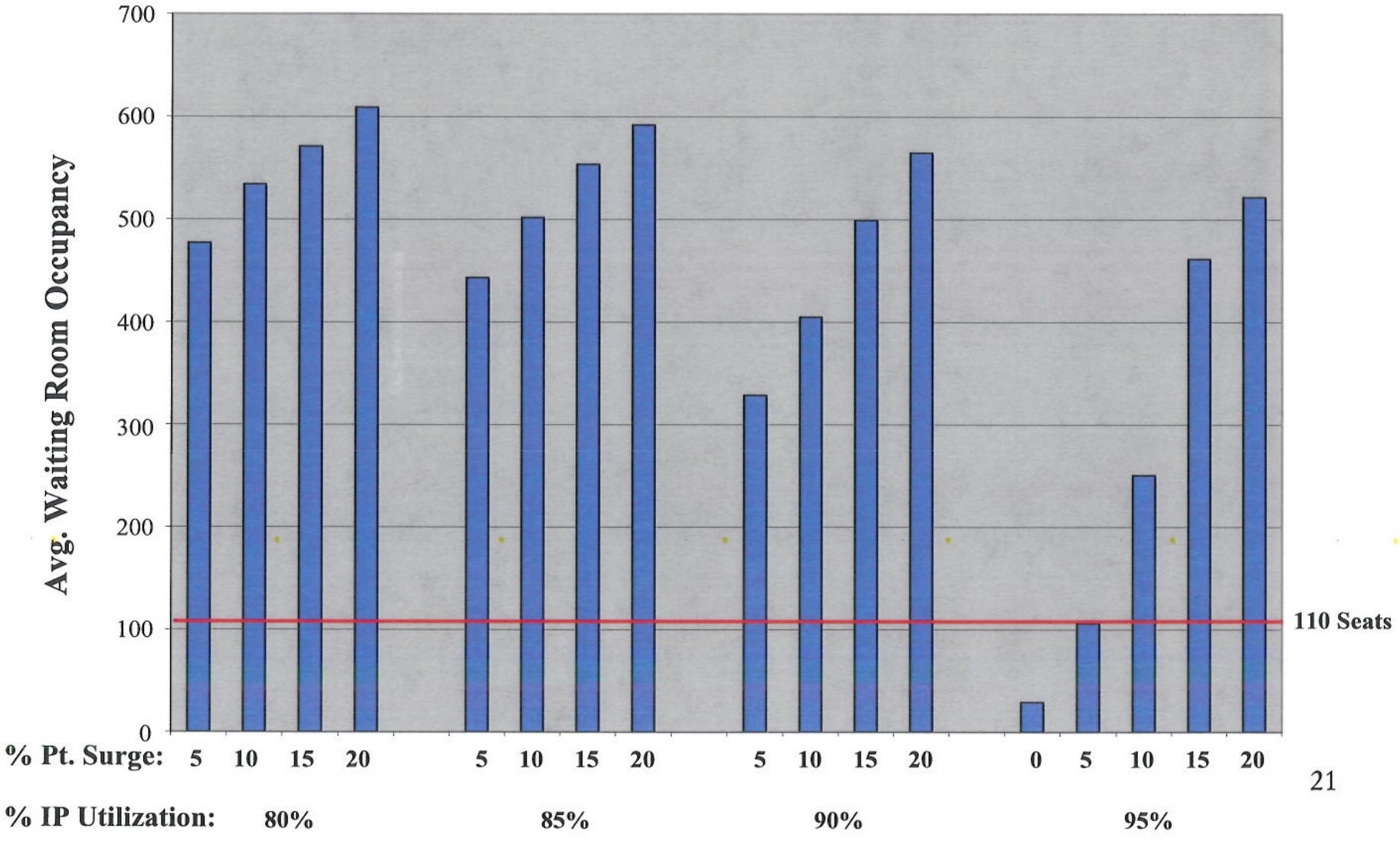
Guests per ED Patient



The simulation shows the waiting room may need more capacity to hold patients waiting for an ED Bed and their guests.

Waiting Room Space Needed

for Patients and Guests



Summary

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Next Steps

- Three Hospital County-Wide Model

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FDI

Health Services LOS ANGELES COUNTY	Los Angeles County Department of Health Services Surge Contingency Plan Option: Short-Term DRAFT Proposal
Overall Goal	Develop contingency capacity for LAC+USC emergency room patients needing admission through the use of existing licensed medical/surgical beds at Rancho Los Amigos National Rehabilitation Center (RLANRC).
Admission Goal	Maximize utilization of existing licensed inpatient beds for acute medical/surgical patients.
Beds	RLANRC currently has 395 licensed beds with 264 functional beds. There are 225 beds that have medical gases. Of the 225 beds that have gases there are 189 staffed, budgeted beds with an average daily census of approximately 164, which leaves an average of 25 beds immediately available. With appropriate staffing, there could be as many as 61 Harris-Rodde compliant beds (225beds-164beds) available for an acute medical/surgery patient surge, if needed.
Patient criteria	Acute medical/surgical patients to include: neurological, orthopedic, congestive heart failure (CHF), chronic obstructive, pulmonary disease, pneumonia, and other approved patients.
Admitting hours	Expand referral hours: Monday-Friday 7:00am - 7:30pm, Saturday 8:00am - 8:00pm, Sunday 8:00am - 12:00pm, Holidays 8:00am - 12:00pm. RLANRC has the ability to expand further to 24 hours/day, if necessary.
Expected # of Daily Admissions	An emergency department surge at LAC+USC of 5% would result in 3.45 additional inpatient admissions per day, requiring approximately 18 additional inpatient beds, given an average length of stay of 5.2 days
Management	RLANRC to provide management oversight for clinical support staff. LAC+USC to provide management oversight for physicians.
Nursing Staff	Unit-based staffing requires 1-2 Nurse Managers and a complement of Supervising Staff Nurses I (SSNI), in addition to a mix of Registered Nurses (RN), Licensed Vocational Nurses (LVN) and Nursing Attendants (NA).
Clinical Staff and Support Staff	RLANRC will provide other clinical staff to support the patient care requirements including, but not limited to, respiratory therapists, physical therapists, social workers, case managers, radiology technicians, dietary counselors, laboratory technicians, security, environmental services, etc.
Physicians	Required are a number of physician specialists to include orthopedic surgeons, radiologists, internists, and other on-call specialists. Also necessary is a physician who is employed half-time at RLANRC and half-time at LAC+USC with dual privileges to review and make all admission decisions to RLANRC acute medicine. An on-site hospitalist who is available 12 hours per day, 7 days per week, is recommended.
Equipment	Use of current facilities with the addition of 1-2 operating rooms, ultrasound system, first aid supplies, and other services and supplies.
Ancillary Services	Laboratory, pharmacy, radiology, and other ancillary services provided by RLANRC.
Care Coordination	Care coordination to be facilitated by the establishment of mini-MAC at LAC+USC.
Disaster Plan	Follow RLANRC's current emergency plan by expanding RLANRC's managed bed capacity.
Timeline	First 25 beds, including staff, available immediately. Remaining beds to be operational prior to Oct 1, 2008.
Budget	The 25 beds that are immediately available are in already in RLANRC's budget. The budget for 36 additional beds is currently being developed.
Other considerations	While RLANRC has more beds available, many are not equipped with wall suction or oxygen capability. Portable equipment could be used, but the lack of proper equipment would limit the number of acute medical surgical patients with chronic obstructive pulmonary disease (COPD), pneumonia, congestive heart failure (CHF), and other diseases requiring oxygen.